UTILITIES & ENERGY SERVICES
TEXAS A&M UNIVERSITY

A. The extent to which the agency has met the percentage goal it established for reducing its usage of electricity, gasoline, and natural gas:

- Energy consumption per gross square foot has been reduced by 45% (364 mBtu per GSF to 202 mBtu per GSF) over a fourteen-year period from FY02 – FY16. The goal in the 2005 Energy Conservation Plan was to achieve an Energy Use Intensity (EUI) of 275 by FY10 which was achieved and surpassed.

- Total real energy consumption has decreased 27 percent over this same fourteen-year period, from 6.74 trillion Btu in FY02 to 4.9 trillion Btu in FY16, while the campus grew by 34 percent, from 18.5 million GSF to 24.7 million GSF.

- Energy consumption reduction measures over this same fourteen-year period (FY02 – FY16) have generated $209 million in avoided cost. Texas A&M University has provided exemplary leadership in the area of energy efficiency improvement and conservation with these accomplishments. (see attached "EUI Chart")

B. The steps the agency may take to increase the percentage goal for reducing its usage of electricity, gasoline, and natural gas:

- The University has established and actively manages an Energy Action Plan (EAP) 2020 which targets further reduction of energy consumption per gross square foot over five years - from FY15 through FY20. The goal of EAP 2020 is to reduce the overall campus EUI from the FY15 baseline of 208 mBtu/GSF to 180 mBtu/ GSF by the end of FY20, or a reduction of 14% per GSF over 5 years. (see attached "EUI Chart")

- In January 2012, the University completed a $15 million energy efficiency projects (phases 1 & 2) with Siemens acting as the Energy Services Company (ESCO) that included consumption reduction measures in 18 buildings and 5 parking garages. These efficiency improvements in the facilities included lighting upgrades, building automations system retrofits, and HVAC system improvements. The first year (FY12) energy consumption reductions in the buildings far exceeded the guarantee for avoidance by 173% for electricity, 182% for chilled water and 145% for heating hot water and similar results have been seen in FY13.

- In February, 2015, the University completed Phase 3 of the SECO loan projects for an additional $4.1 million in HVAC and lighting improvements in 10 buildings with a total of 802,000 GSF. This project is anticipated to avoid 5 million kWh of electricity, over 30,000 mmBtu of chilled water and almost 10,000 mmBtu of heating hot water.

- In April, 2015, the University received approval from SECO to move forward with Phases 4 and 5 valued at approximately $11.3 million in HVAC, hydronic pumping and lighting improvements in 26 buildings and replacement of almost 3,000 of the 4,085 exterior lights with LED replacement. These projects have an estimated energy avoidance of 8 million kWh of electricity, over 20,000 mmBtu of

chilled water and almost 8,000 mmBtu of heating hot water. The project is approximately 50% complete.

- The Energy Stewardship Program (ESP) continues to pay dividends by closing the gap between organizational needs and operational efficiencies. The University currently has 6 full time Energy Stewards, each assigned an average of 2.6 million GSF. The stewards proved invaluable as the recent $15 million in SECO loan projects were implemented, by facilitating the construction process and enabling additional cost avoidances to be achieved. Instead of the construction project simply making modifications and walking away, the stewards identified additional opportunities through scheduling and setbacks that allowed the project to exceed expectations by more than 50%.

- An updated Utilities & Energy Services Capital Plan was completed in 2012, which documented and justified $46 million in production and major infrastructure improvements that are required over the next five years. These projects were placed on the University Capital Plan for the period of FY13 – FY17. The Texas A&M Board of Regents has approved design and construction on all phases of capital improvements. The initial FY13 utility production upgrade project has a $15.4 million budget and will increase capacity for a growing campus, replace aging equipment, and generate $1.25 million annually in cost avoidance through improved operating efficiency. The FY14 project has a $20.2 million budget and will continue upgrading campus production facilities to meet the growing demands of the campus while cost avoiding over $1 million annually. The FY15 project has a $7.4 million budget that will round out the production capacity and efficiency improvements.

  The scope of capital upgrades that are **completed** include:

  - Replacement of Chiller 103 @ SUP1
  - Replacement of Chiller 07 @ CUP
  - Addition of Heat Recovery Chiller 207 @ SUP2
  - CUP & SUP1 Cooling Tower Upgrades
  - Chilled Water Production Optimization @ CUP, SUP1, SUP2 & SUP3
  - Installation of Chiller 206 @ SUP2
  - Installation of Thermal Energy Storage @ SUP2
  - Replacement of Chiller 10 @ CUP
  - Replacement of Chillers 301 & 302 @ SUP3
  - Cooling Tower Upgrade @ SUP3
  - Addition of a Heating Hot Water Capacity @ SUP1
  - Refurbishment of Chiller 8 & 9 @ CUP
  - Cooling Tower Upgrade @ SUP2
  - Replacement of Chiller 201 @ SUP2

  In FY17, the University will update its year Utilities and Energy Services Capital Plan which will provide the foundation for future improvements efficiency, reliability and capacity.

C. **Any additional ideas the agency has for reducing energy expenditures relating to facilities**:

- The University continues to focus its Energy Stewardship team and other resources on Top 50 campus buildings, which consume 50% of the campus energy. This strategy will continue to allow a more detailed focus on identifying and correcting the issues to reduce overall energy consumption. While the other buildings will still be carefully managed, this more focused approach will lead to improved performance on a campus that exceeds 24 million GSF.

- In FY16, the University went operational with a chilled water optimization program. This program greatly reduces the pumping energy required by the campus by carefully monitoring the building loads and only moving the water when as required to meet load. With chilled water loops that exceed one million gallons, this will lead to significant energy savings.

- In addition to identifying opportunities to improve operating efficiency of building HVAC, BAS, and lighting systems, UES is evaluating opportunities to more precisely regulate the face velocity associated with over 1,000 fume hoods located on the Texas A&M University campus – to ensure safe operation with improved energy efficiency.

- The University will target energy awareness in FY17 by developing an Energy Performance Improvement Pilot Program designed to achieve greater buy-in through increased engagement to generate more awareness and support at the individual and department levels. It is our belief that as customers and occupants understand how much it costs to operate their building, engagement and support for conservation and efficiency improvement efforts will be stronger.

- The University uses the EnergyCAP program to track all utility cost by building, by utility, and by customer across the College Station campus. In addition, the campus uses the Schneider PME system to make data from all meters across the campus available in real-time to provide feedback to technicians when making efficiency improvements.

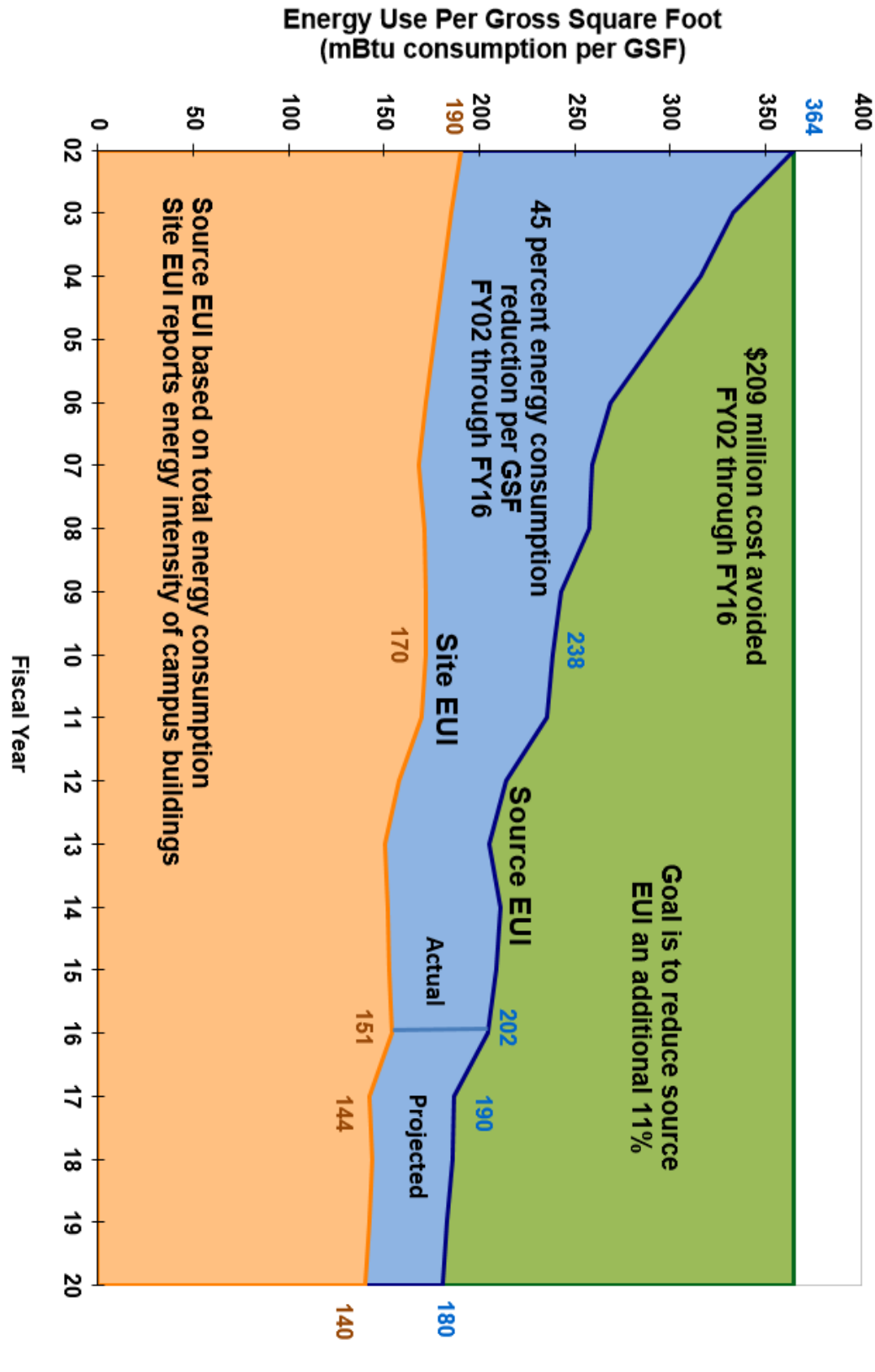
D. Any additional ideas the agency has to minimize fuel usage in all vehicles and equipment used by the agency.

The following procedures have been and still are in place:

- Reduced fleet vehicles – retiring older, less efficient vehicles
- Photocell lighting used on exterior of all garages
- Conservation tips have been posted on our website
- A brochure has been produced regarding fuel conservation
- We continue to communicate our efforts with Communication Representative from EAP 2020 Advisory Committee and offer assistance where needed with University-wide conservation efforts
- Contracted with Alta Inc. to develop a comprehensive bike plan to encourage alternative transportation.
- Established an agreement with Zipcar to provide car share at various locations on campus to reduce vehicular traffic.
- Provided more than 20,000 hours of additional bus service in FY 2016 to reduce vehicular traffic carrying over 7,000,000 rides annually.
- Exploring new technology to provide guidance in our facilities to available spaces. This has been implemented in our new Cain Garage. It reduces circulation and emissions by getting vehicles in place faster and more efficiently.

University Fleet Fuel Consumption (provided by Transportation Services)

University Fleet		FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	Reduction from FY04	
Fuel Type	Units														%	Actual
Diesel	Gallons	979,738	893,342	823,367	320,392	265,168	204,544	235,256	229,368	236,938	262,074	405,642	554,237	605,980		
B20	Gallons	-	-	22,593	259,422	281,194	289,874	211,105	211105	218,667	253,592	126,741	-			
Total Diesel		**979,738**	**893,342**	**845,960**	**579,814**	**546,362**	**494,418**	**446,361**	**440,473**	**455,605**	**515,666**	**532,383**	**554,237**	**605,980**	**-38%**	**(373,758)**
Gasoline	Gallons	812,081	809,173	771,819	682,208	564,620	435,533	316,216	314,460	288,973	288,221	284,525	30,429	310,678	-62%	(501,403)
Propane	MMBTU	973	793	540	908	489	932	391	24	265	133	477	864	678	-30%	(295)


Energy Use Intensity (Energy Consumption per GSF)
Texas A&M University, College Station, Texas
Energy Use Per Gross Square Foot
(mBtu consumption per GSF)
400
350
300
250
200
150
100
50
0
364
238
190
170
151
144
140
202
190
180
$209 million cost avoided
FY02 through FY16
Goal is to reduce source
EUI an additional 11%
45 percent energy consumption
reduction per GSF
FY02 through FY16
Source EUI
Site EUI
Actual
Projected
Source EUI based on total energy consumption
Site EUI reports energy intensity of campus buildings
02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
Fiscal Year
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